

Disc seeding and time of sowing

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Take home messages

- *Time of sowing is more important than seeding system.*
- *Depth control on disc seeding systems can effect crop establishment.*
- *In this trial the knife-point press wheel seeding system out yielded the single disc seeding system.*

Background

There has recently been widespread discussion around the adoption of disc seeding systems across the Wimmera Mallee. The adoption of knife-point, no-till seeding systems has been widely successful and a percentage of farmers are now looking at disc based zero-till seeding systems as the next step.

Some of the reported advantages of disc seeders are:

- very little to no soil disturbance
- faster sowing speed – more timely sowing operation
- no burial of weed seeds
- anecdotally disc seeders encourage soil microbes and bacteria which can reduce the impact of certain root diseases after long term use

Some of the reported disadvantages of disc seeders are:

- poor to no incorporation of pre-emergent herbicides, especially trifluralin
- subsequent poor weed control with pre-emergent herbicides
- potential reliance on expensive in-crop selective and/or less volatile pre-emergent herbicides
- poor handling of heavy stubble loads (hair pinning) and sticky soils
- smearing can occur when seeding into wet clay soils
- increased incidence of rhizoctonia

Aim

To compare the performance of disc and knife-point seeding at 2 different sowing times (early and late).

Method

Two trials were established, 1 at Woomelang and 1 at St Arnaud using a complete randomised block design with 3 replicates. The knife-point treatment was sown using the BCG's no-till seeder (knife-points, press wheels) and the disc seeder used was a single disc Bourgault 57 – 25 seeder owned and sown by O'Connor's Case IH.

Location:	Woomelang and St Arnaud
Replicates:	3
Sowing date:	Woomelang: early (30 April 2009), late (10 July 2009) St Arnaud: early (4 May 2009), late (29 June 2009)
Seeding density:	120 plants/m ²
Crop type:	Yitpi wheat
Row spacing:	30cm row spacing

Emergence counts and weed counts were taken for both seeding systems for the early and late sowing times at the 3-leaf stage (GS13) except at the Woomelang site where late emergence counts were not completed. The trial was harvested using the plot harvester and grain quality analysed for protein and screenings.

Results

There was no difference in establishment between systems at the Woomelang site (Table 1). However, crop establishment rates were higher when sown using knife-points compared to discs at the St Arnaud site at both the early and late sowing times (Table 1) (late sowing data not shown). At the St Arnaud site, the early sown disc system reduced the plant establishment by 32 plants/m².

There was difficulty controlling depth during the disc sowing operation (at both sites) which may have affected establishment at the St Arnaud site. Visually it appeared that about 10% of seed was left on the soil surface during the sowing operation. The rest of the seed appeared to be well placed within the seedbed – this may be an idiosyncrasy of this particular system.

Table 1. Plant establishment for both systems at Woomelang and St Arnaud at early time of sowing (plants/m²).

System	Plant establishment (m ²)	
	Woomelang	St Arnaud
Knife	114	134
Disc	93	102
P-Value	NS	P<0.01
LSD (P=0.05)		12
CV %	17	11

Yields

At Woomelang, using a knife-point seeding system significantly increased yield compared to the disc seeding system at both times of sowing. When assessing just late versus early sowing, there was at least 1t/ha yield penalty found sowing late, independent of the seeding system.



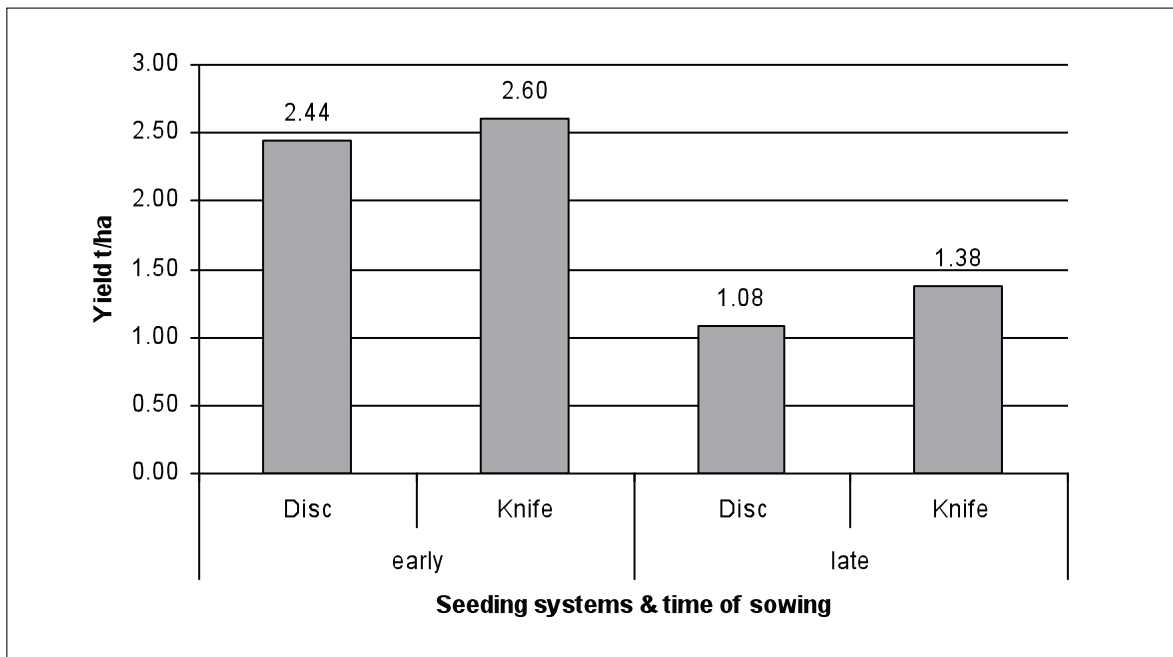


Figure 1. Woomelang wheat yield for both systems and time of sowing (t/ha).

The knife-point press wheel seeding system at St Arnaud yielded higher than the disc system at both times of sowing ($P < 0.05$, Figure 2). Like the findings at Woomelang, early sowing with either system significantly increased yields by 0.7t/ha.

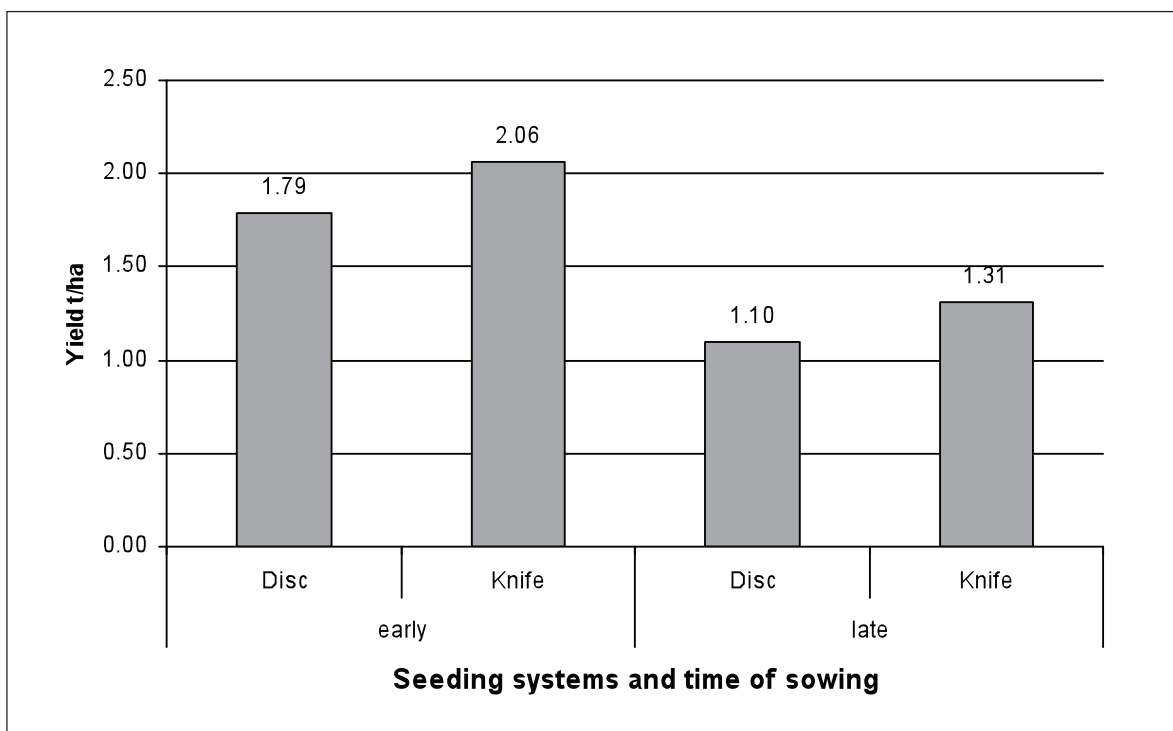


Figure 2. St Arnaud wheat yield for both systems and time of sowing (t/ha).

Grain quality

Woomelang

There was no difference in wheat protein between any of the treatments at Woomelang. At the early time of sowing there was no difference between the 2 systems when comparing screenings. However, at the late time of sowing, screenings were significantly higher (>8%) in the disc system (Table 2). This was not mirrored by the knife-point system. Results show no difference in screenings between the early and late knife-point treatments (Table 2).

St Arnaud

There was an overall 1% increase in grain protein using discs (early and late) at the St Arnaud site (data not shown). All later sown treatments regardless of system had higher proteins than the early sown treatments ($P < 0.001$, CV 6.9%). There was no difference in screenings between the 2 seeding systems. However there was a difference in terms of the sowing times with early sowing having lower screenings than the late sowing time (Table 2).

Table 2. Woomelang and St Arnaud screenings (%).

Time of sowing	Woomelang		St Arnaud
	Disc	Knife	Both systems
Early	6.4	6.2	10.38
Late	13.7	5.6	16.11
P-Value	P<0.02		P<0.01
LSD (P=0.05)	4.6		2.1
CV %	47		18

Interpretation

This trial highlighted that the time of sowing is more important than the seeding system. Earlier sowing yielded significantly higher than late sowing at both sites.

The knife-point press wheel system has been, and still is, an ideal system for the Wimmera Mallee, continuing to perform well in this environment. Disc seeders will have a role in some farming systems in the future but careful consideration is encouraged before investing into a disc seeding system. The disc system will work, but management practices will need to be refined before adoption to minimise potential problems. Issues such as stubble (hair) pinning, inconsistent herbicide incorporation and weed control as well as crop establishment need to be managed and overcome before an effective system can be developed.

As mentioned in the *Establishment of wheat as influenced by seeding systems* article in this manual (page 122), new technology development has seen the use of soil shifting row-cleaners fitted ahead of single disc openers (eg Tobin disc drills, WA), a seed boot shield design with built-in soil deflector (eg Daybreak) and reversible and adjustable disc closers (Ndf-Ag design). These technologies are designed to achieve herbicide incorporation while also providing potential benefits for reduced or controlled crop damage.

Acknowledgments

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